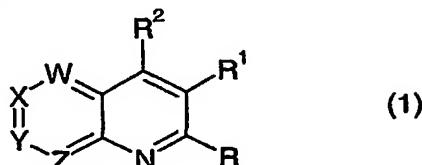


CLAIMS

EPO - DG 1

1. The compound of the general formula (1):



114

04. 10. 2004

5

wherein

W, X and Y are all CH and Z is N; R is halo;

R¹ is aryl, heteroaryl, morpholino, piperidino or pyrrolidino; R² is NR³R⁴,R³ and R⁴ are independently H, C₁₋₈ alkyl, C₂₋₈ alkenyl, C₂₋₈ alkynyl, aryl,aryl(C₁₋₈)alkyl, C₃₋₈ cycloalkyl, C₃₋₈ cycloalkyl(C₁₋₆)alkyl, heteroaryl, hetero-

10

aryl(C₁₋₈)alkyl, NR⁵R⁶, provided that not both R³ and R⁴ are H or NR⁵R⁶, orR³ and R⁴ together form a C₃₋₇ alkylene or C₃₋₇ alkenylene chain optionally substituted with one or more C₁₋₄ alkyl or C₁₋₄ alkoxy groups, or,together with the nitrogen atom to which they are attached, R³ and R⁴ form a morpholine, thiomorpholine, thiomorpholine S-oxide or thiomorpholine S-dioxide ring or a piperazine or piperazine N-(C₁₋₄)alkyl (especially N-methyl) ring; and

15

R⁵ and R⁶ are independently H, C₁₋₈ alkyl, C₂₋₈ alkenyl, C₂₋₈ alkynyl, aryl, aryl(C₁₋₈)alkyl, C₃₋₈ cycloalkyl, C₃₋₈ cycloalkyl(C₁₋₆)alkyl, heteroaryl or hetero-aryl(C₁₋₈)alkyl;

20

any of the foregoing alkyl, alkenyl, alkynyl or cycloalkyl groups or moieties (other than for R⁸) being optionally substituted with halogen, cyano, C₁₋₆ alkoxy, C₁₋₆ alkylcarbonyl, C₁₋₆ alkoxycarbonyl, C₁₋₆ haloalkoxy, C₁₋₆ alkylthio, tri(C₁₋₄)alkylsilyl, C₁₋₆ alkylamino or C₁₋₆ dialkylamino,

25

any of the foregoing morpholine, thiomorpholine, piperidine, piperazine and pyrrolidine rings being optionally substituted with C₁₋₄ alkyl (especially methyl), and any of the foregoing aryl or heteroaryl groups or moieties being optionally substitutedwith one or more substituents selected from halo, hydroxy, mercapto, C₁₋₆ alkyl,C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ alkoxy, C₂₋₆ alkenyloxy, C₂₋₆ alkynyoxy, halo(C₁₋₆)alkyl, halo(C₁₋₆)alkoxy, C₁₋₆ alkylthio, halo(C₁₋₆)alkylthio, hydroxy(C₁₋₆)alkyl, C₁₋₄ alkoxy(C₁₋₆)alkyl, C₃₋₆ cycloalkyl, C₃₋₆ cycloalkyl(C₁₋₄)alkyl, phenoxy, benzyloxy,

30

benzoyloxy, cyano, isocyano, thiocyanato, isothiocyanato, nitro, -NR^{"R"}", -NHCOR^{"R"}", -NHCONR^{"R"}", -CONR^{"R"}", -SO₂R^{"R"}", -OSO₂R^{"R"}", -COR^{"R"}", -CR^{"R"}=NR^{"R"}", or -N=CR^{"R"}", in which R^{"R"} and R^{"R"} are independently hydrogen, C₁₋₄ alkyl, halo-(C₁₋₄)alkyl, C₁₋₄ alkoxy, halo(C₁₋₄)alkoxy, C₁₋₄ alkylthio, C₃₋₆ cycloalkyl, C₃₋₆ cycloalkyl-

(C₁₋₄)alkyl, phenyl or benzyl, the phenyl and benzyl groups being optionally substituted with halogen, C₁₋₄ alkyl or C₁₋₄ alkoxy.

2. A compound according claim 1 wherein
5 R³ is C₁₋₈ alkyl, halo(C₁₋₈)alkyl, hydroxy(C₁₋₈)alkyl, C₁₋₄ alkoxy(C₁₋₈)alkyl, C₁₋₄ alkoxy-halo(C₁₋₈)alkyl, tri(C₁₋₄)alkylsilyl(C₁₋₆)alkyl, C₁₋₄ alkylcarbonyl(C₁₋₈)alkyl, C₁₋₄ alkyl-carbonylhalo(C₁₋₈)alkyl, phenyl(C₁₋₄)alkyl, C₂₋₈ alkenyl, halo(C₂₋₈)alkenyl, C₂₋₈ alkynyl, C₃₋₈ cycloalkyl optionally substituted with chloro, fluoro or methyl, C₃₋₈ cycloalkyl-(C₁₋₄)alkyl, phenylamino, piperidino or morpholino, the phenyl ring of phenylalkyl or phenylamino being optionally substituted with one, two or three substituents selected from halo, C₁₋₄ alkyl, halo(C₁₋₄)alkyl, C₁₋₄ alkoxy and halo(C₁₋₄)alkoxy; and
10 R⁴ is H, C₁₋₄ alkyl, halo(C₁₋₄)alkyl or amino, or
R³ and R⁴ together form a C₃₋₇ alkylene or C₃₋₇ alkenylene chain optionally substituted with methyl, or,
15 together with the nitrogen atom to which they are attached, R³ and R⁴ form a morpholine, thiomorpholine, thiomorpholine S-oxide or thiomorpholine S-dioxide ring or a piperazine or piperazine N-(C₁₋₄)alkyl (especially N-methyl) ring, in which the morpholine or piperazine rings are optionally substituted with methyl.
- 20 3. A compound according to claim 1 or 2 claims wherein
R¹ is phenyl optionally substituted with from one to five halogen atoms or with from one to three substituents selected from halo, C₁₋₄ alkyl, halo(C₁₋₄)alkyl, C₁₋₄ alkoxy or halo(C₁₋₄)alkoxy, pyridyl optionally substituted with from one to four halogen atoms or with from one to three substituents selected from halo, C₁₋₄ alkyl, halo(C₁₋₄)alkyl,
25 C₁₋₄ alkoxy or halo(C₁₋₄)alkoxy, 2- or 3-thienyl optionally substituted with from one to three halogen atoms or with from one to three substituents selected from halo, C₁₋₄ alkyl, halo(C₁₋₄)alkyl, C₁₋₄ alkoxy or halo(C₁₋₄)alkoxy, or piperidino or morpholino both optionally substituted with one or two methyl groups.
- 30 4. A compound according to claim 3 wherein R¹ is 2,6-difluorophenyl, 2-fluoro-6-chlorophenyl, 2,5,6-trifluorophenyl, 2,4,6-trifluorophenyl, 2,6-difluoro-4-methoxyphenyl or pentafluorophenyl.
- 35 5. A compound according to claim 1 wherein W, X and Y are all CH and Z is N;
R is halo, R¹ is aryl, heteroaryl, morpholino, piperidino or pyrrolidino; R² is NR³R⁴; R³ and R⁴ are independently H, C₁₋₈ alkyl, C₂₋₈ alkenyl, C₂₋₈ alkynyl, aryl,

aryl(C₁₋₈)alkyl, C₃₋₈ cycloalkyl, C₃₋₈ cycloalkyl(C₁₋₆)alkyl, heteroaryl, heteroaryl(C₁₋₈)alkyl, NR⁵R⁶, provided that not both R³ and R⁴ are H or NR⁵R⁶, or R³ and R⁴ together form a C₃₋₇ alkylene or C₃₋₇ alkenylene chain optionally substituted with one or more C₁₋₄ alkyl or C₁₋₄ alkoxy groups, or,

5 together with the nitrogen atom to which they are attached, R³ and R⁴ form a morpholine, thiomorpholine, thiomorpholine S-oxide or thiomorpholine S-dioxide ring or a piperazine or piperazine N-(C₁₋₄)alkyl (especially N-methyl) ring; and R⁵ and R⁶ are independently H, C₁₋₈ alkyl, C₂₋₈ alkenyl, C₂₋₈ alkynyl, aryl, aryl(C₁₋₈)alkyl, C₃₋₈ cycloalkyl, C₃₋₈ cycloalkyl(C₁₋₆)alkyl, heteroaryl or heteroaryl(C₁₋₈)alkyl;

10 any of the foregoing alkyl, alkenyl, alkynyl or cycloalkyl groups or moieties being optionally substituted with halogen, cyano, C₁₋₆alkoxy, C₁₋₆ alkylcarbonyl, C₁₋₆ alkoxy-carbonyl, C₁₋₆ haloalkoxy, C₁₋₆ alkylthio, tri(C₁₋₄)alkylsilyl, C₁₋₆ alkylamino or C₁₋₆dialkylamino, any of the foregoing morpholine, thiomorpholine, piperidine,

15 piperazine and pyrrolidine rings being optionally substituted with C₁₋₄ alkyl (especially methyl), and any of the foregoing aryl, heteroaryl, aryloxy or heteroaryl groups being optionally substituted with one or more substituents selected from halo, hydroxy, mercapto, C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆alkynyl, C₁₋₆ alkoxy, C₂₋₆ alkenyloxy,

20 C₂₋₆alkynyloxy, halo(C₁₋₆)alkyl, halo(C₁₋₆)alkoxy, C₁₋₆ alkylthio, halo(C₁₋₆)alkylthio, hydroxy(C₁₋₆)alkyl, C₁₋₄ alkoxy(C₁₋₆)alkyl, C₃₋₆cycloalkyl, C₃₋₆ cycloalkyl(C₁₋₄)alkyl, phenoxy, benzyloxy, benzoyloxy, cyano, isocyano, thiocyanato, isothiocyanato, nitro, -NR^{"R"}, -NHCOR^{"R"}, -NHCONR^{"R"}, -CONR^{"R"}, -SO₂R^{"R"}, -OSO₂R^{"R"}, -COR^{"R"}, -CR^{"R"}=NR^{"R"} or -N=CR^{"R"}, in which R^{"R"} and R^{"R"} are independently hydrogen, C₁₋₄alkyl, halo(C₁₋₄)alkyl, C₁₋₄ alkoxy, halo(C₁₋₄)alkoxy, C₁₋₄ alkylthio, C₃₋₆ cycloalkyl,

25 C₃₋₆ cycloalkyl(C₁₋₄)alkyl, phenyl or benzyl, the phenyl and benzyl groups being optionally substituted with halogen, C₁₋₄ alkyl or C₁₋₄ alkoxy.

6. A compound according to claim 1 wherein W, X and Y are all CH and Z is N;
R is halo; R¹ is aryl, heteroaryl, morpholino, piperidino or pyrrolidino; R² is NR³R⁴,
30 R³ is C₁₋₄ alkyl, halo(C₁₋₄)alkyl, C₂₋₄ alkenyl, C₃₋₆ cycloalkyl, C₃₋₆ cycloalkyl(C₁₋₄)alkyl or phenylamino in which the phenyl ring is optionally substituted with one, two or three substituents selected from halo, C₁₋₄ alkyl, halo(C₁₋₄)alkyl, C₁₋₄ alkoxy and halo(C₁₋₄)alkoxy; and R⁴ is H, C₁₋₄ alkyl or amino, or
R³ and R⁴ together form a C₄₋₆ alkylene chain optionally substituted with C₁₋₄ alkyl or
35 C₁₋₄ alkoxy, or
together with the nitrogen atom to which they are attached, R³ and R⁴ form a

- 90 -

- morpholine, thiomorpholine, thiomorpholine S-oxide or thiomorpholine S-dioxide ring or a piperazine or piperazine *N*-(C₁₋₄)alkyl (especially *N*-methyl) ring; any of the foregoing alkyl, alkenyl, alkynyl or cycloalkyl groups or moieties being optionally substituted with halogen, cyano, C₁₋₆ alkoxy, C₁₋₆alkylcarbonyl, C₁₋₆alkoxy- carbonyl, C₁₋₆ haloalkoxy, C₁₋₆ alkylthio, tri(C₁₋₄)alkylsilyl, C₁₋₆ alkylamino or C₁₋₆dialkylamino, any of the foregoing morpholine, thiomorpholine, piperidine, 5 piperazine and pyrrolidine rings being optionally substituted with C₁₋₄ alkyl (especially methyl), and any of the foregoing aryl or heteroaryl groups or moieties being optionally substituted with one or more substituents selected from halo, hydroxy, mercapto, C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ alkoxy, C₂₋₆ alkenyloxy, 10 C₂₋₆alkynyloxy, halo(C₁₋₆)alkyl, halo(C₁₋₆)alkoxy, C₁₋₆ alkylthio, halo(C₁₋₆)alkylthio, hydroxy(C₁₋₆)alkyl, C₁₋₄ alkoxy(C₁₋₆)alkyl, C₃₋₆ cycloalkyl, C₃₋₆ cycloalkyl(C₁₋₄)alkyl, phenoxy, benzyloxy, benzoyloxy, cyano, isocyano, thiocyanato, isothiocyanato, nitro, -NR³"R⁴", -NHCOR", -NHCONR"R", -CONR"R", -SO₂R", -OSO₂R", -COR", -CR"=NR" or -N=CR"R", in which R" and R" are independently hydrogen, 15 C₁₋₄alkyl, halo(C₁₋₄)alkyl, C₁₋₄ alkoxy, halo(C₁₋₄)alkoxy, C₁₋₄ alkylthio, C₃₋₆ cycloalkyl, C₃₋₆ cycloalkyl(C₁₋₄)alkyl, phenyl or benzyl, the phenyl and benzyl groups being optionally substituted with halogen, C₁₋₄ alkyl or C₁₋₄ alkoxy.
- 20 7. A compound according to claim 1 wherein one of W, X and Y are all CH and Z is N; R is halo; R¹ is optionally substituted phenyl; R² is NR³R⁴, R³ and R⁴ are independently H, C₁₋₈ alkyl, C₂₋₈ alkenyl, C₂₋₈ alkynyl, aryl, aryl(C₁₋₈)alkyl, C₃₋₈ cycloalkyl, C₃₋₈ cycloalkyl(C₁₋₆)alkyl, heteroaryl, hetero- 25 aryl(C₁₋₈)alkyl, NR⁵R⁶, provided that not both R³ and R⁴ are H or NR⁵R⁶, or R³ and R⁴ together form a C₃₋₇ alkylene or C₃₋₇ alkenylene chain optionally substituted with one or more C₁₋₄ alkyl or C₁₋₄ alkoxy groups, or, together with the nitrogen atom to which they are attached, R³ and R⁴ form a morpholine, thiomorpholine, thiomorpholine S-oxide or thiomorpholine S-dioxide ring or a piperazine or piperazine *N*-(C₁₋₄)alkyl (especially *N*-methyl) ring; and 30 R⁵ and R⁶ are independently H, C₁₋₈ alkyl, C₂₋₈ alkenyl, C₂₋₈ alkynyl, aryl, aryl(C₁₋₈)alkyl, C₃₋₈ cycloalkyl, C₃₋₈ cycloalkyl(C₁₋₆)alkyl, heteroaryl or hetero- aryl(C₁₋₈)alkyl; any of the foregoing alkyl, alkenyl, alkynyl or cycloalkyl groups or moieties being optionally substituted with halogen, cyano, C₁₋₆ alkoxy, C₁₋₆alkylcarbonyl, C₁₋₆ al- 35 koxycarbonyl, C₁₋₆ haloalkoxy, C₁₋₆ alkylthio, tri(C₁₋₄)alkylsilyl, C₁₋₆ alkylamino or C₁₋₆dialkylamino; any of the foregoing morpholine, thiomorpholine, piperidine,

piperazine and pyrrolidine rings being optionally substituted with C₁₋₄ alkyl (especially methyl), and any of the foregoing aryl or heteroaryl groups or moieties, including the phenyl group of R¹, being optionally substituted with one or more substituents selected from halo, hydroxy, mercapto, C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl,
5 C₁₋₆alkoxy, C₂₋₆ alkenyloxy, C₂₋₆ alkynyoxy, halo(C₁₋₆)alkyl, halo(C₁₋₆)alkoxy, C₁₋₆alkylthio, halo(C₁₋₆)alkylthio, hydroxy(C₁₋₆)alkyl, C₁₋₄ alkoxy(C₁₋₆)alkyl, C₃₋₆cycloalkyl, C₃₋₆ cycloalkyl(C₁₋₄)alkyl, phenoxy, benzyloxy, benzoyloxy, cyano, isocyano, thiocyanato, isothiocyanato, nitro, -NR²"R³", -NHCOR", -NHCONR"R³", -CONR"R³", -SO₂R³", -OSO₂R³", -COR", -CR"=NR³" or -N=CR"R³", in which R²" and R³" are independently hydrogen, C₁₋₄ alkyl, halo(C₁₋₄)alkyl, C₁₋₄ alkoxy, 10 halo(C₁₋₄)alkoxy, C₁₋₄ alkylthio, C₃₋₆ cycloalkyl, C₃₋₆ cycloalkyl(C₁₋₄)alkyl, phenyl or benzyl, the phenyl and benzyl groups being optionally substituted with halogen, C₁₋₄alkyl or C₁₋₄ alkoxy.

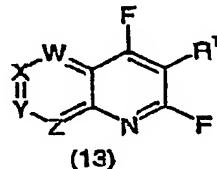
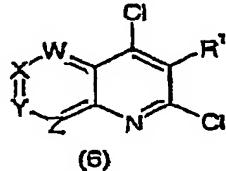
- 15 8. A compound according to claim 1 wherein W, X and Y are all CH and Z is N; R is halo; R¹ is phenyl optionally substituted with from one to five halogen atoms or with from one to three substituents selected from halo, C₁₋₄ alkyl, halo(C₁₋₄)alkyl, C₁₋₄alkoxy or halo(C₁₋₄)alkoxy, pyridyl optionally substituted with from one to four halogen atoms or with from one to three substituents selected from halo, C₁₋₄ alkyl, 20 halo(C₁₋₄)alkyl, C₁₋₄alkoxy or halo(C₁₋₄)alkoxy, 2- or 3-thienyl optionally substituted with from one to three halogen atoms or with from one to three substituents selected from halo, C₁₋₄alkyl, halo(C₁₋₄)alkyl, C₁₋₄ alkoxy or halo(C₁₋₄)alkoxy, or piperidino or morpholino both optionally substituted with one or two methyl groups; R² is NR³R⁴; R³ is C₁₋₈ alkyl, halo(C₁₋₈)alkyl, hydroxy(C₁₋₈)alkyl, C₁₋₄ alkoxy(C₁₋₈)alkyl, C₁₋₄ alkoxy-halo(C₁₋₈)alkyl, tri(C₁₋₄)alkylsilyl(C₁₋₆)alkyl, C₁₋₄ alkylcarbonyl(C₁₋₈)alkyl, C₁₋₄ alkyl-carbonylhalo(C₁₋₈)alkyl, phenyl(C₁₋₄)alkyl, C₂₋₈ alkenyl, halo(C₂₋₈)alkenyl, C₂₋₈ alkynyl, 25 C₃₋₈ cycloalkyl optionally substituted with chloro, fluoro or methyl, C₃₋₈ cycloalkyl-(C₁₋₄)alkyl, phenylamino, piperidino or morpholino, the phenyl ring of phenylalkyl or phenylamino being optionally substituted with one, two or three substituents selected from halo, C₁₋₄ alkyl, halo(C₁₋₄)alkyl, C₁₋₄ alkoxy and halo(C₁₋₄)alkoxy; and 30 R⁴ is H, C₁₋₄ alkyl, halo(C₁₋₄)alkyl or amino, or R³ and R⁴ together form a C₃₋₇ alkylene or C₃₋₇ alkenylene chain optionally substituted with methyl, or, together with the nitrogen atom to which they are attached, R³ and R⁴ form a 35 morpholine, thiomorpholine, thiomorpholine S-oxide or thiomorpholine S-dioxide ring

- 92 -

or a piperazine or piperazine N-(C₁₋₄)alkyl (especially N-methyl) ring, in which the morpholine or piperazine rings are optionally substituted with methyl.

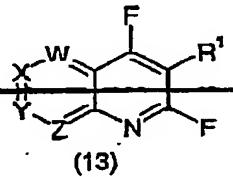
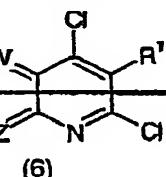
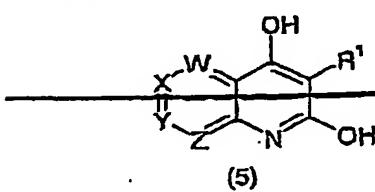
9. A compound according to claim 1 wherein one of W, X and Y are all CH and Z is N; R is halo; R¹ is phenyl optionally substituted with from one to five halogen atoms or with from one to three substituents selected from halo, C₁₋₄ alkyl, halo(C₁₋₄)alkyl, C₁₋₄ alkoxy or halo(C₁₋₄)alkoxy; R² is NR³R⁴; R³ is C₁₋₄ alkyl, halo(C₁₋₄)alkyl, C₂₋₄ alkenyl, C₃₋₈ cycloalkyl, C₃₋₈ cycloalkyl(C₁₋₄)alkyl or phenylamino in which the phenyl ring is optionally substituted with one, two or three substituents selected from halo, C₁₋₄ alkyl, halo(C₁₋₄)alkyl, C₁₋₄ alkoxy and halo(C₁₋₄)alkoxy; and R⁴ is H, C₁₋₄ alkyl or amino, or R³ and R⁴ together form a C₄₋₆ alkylene chain optionally substituted with methyl, or, together with the nitrogen atom to which they are attached, R³ and R⁴ form a morpholine ring.

10. A process for preparing a compound of the general formula (1) according to claim 1 wherein one of R is chloro or fluoro and R² is NR³R⁴ and W, X, Y, Z, R¹, R³ and R⁴ are as defined in claim 1, which comprises reacting an amine of the general formula NR³R⁴ with a compound of the general formula (6) or (13);



wherein W, X, Y, Z and R' are as defined in claim 1.

11. The intermediate chemicals having the general formulae (5), (6) and (13):



wherein W, X, Y, Z and R¹ are as defined in claim 1.

- 25 12. A plant fungicidal composition comprising a fungicidally effective amount of a compound as defined in claim 1 and a suitable carrier or diluent therefor.

1-2005

19.APR.2005 16:12

SYNGENTA AG +41 61 3237010

GB0305248

NR. 860 S.3

- 93 -

- 13.** A method of combating or controlling phytopathogenic fungi which comprises
- 12.** applying to a plant, to a seed of a plant, to the locus of the plant or seed or to soil or to any other plant growth medium, a fungicidally effective amount of a compound according to claim 1 or a composition according to claim 12.